Independent Market Operator

Reserve Capacity Mechanism Working Group (RCMWG)

Agenda

Meeting No.	2
Location:	IMO Board Room, Level 3, Governor Stirling Tower, 197 St Georges Terrace, Perth
Date:	Tuesday 27 March 2012
Time:	Commencing at 2.00 to 5.00pm

Item	Subject	Responsible	Time
1.	**WELCOME**	**Chair**	2 min
2.	**APOLOGIES / ATTENDANCE**	**Chair**	2 min
3.	**MINUTES ARISING FROM MEETING 1**	**Chair**	10 min
4.	**ACTIONS ARISING**	**Chair**	10 min
5.	**PRESENTATION: OVER-SUPPLY OF CAPACITY**	**Mr Mike Thomas The Lantau Group**	90 min
6.	**PROPOSED SCHEDULE OF WORK FOR RCMWG**	**Chair**	15 min
7.	**GENERAL BUSINESS**	**Chair**	10 min

Independent Market Operator

Reserve Capacity Mechanism Working Group

Minutes

Meeting No.	1
Location:	IMO Boardroom Level 3, 197 St Georges Terrace, Perth
Date:	Wednesday 15 February 2012
Time:	Commencing at 1.00pm – 5.00pm

Attendees	
Allan Dawson	Chair
Suzanne Frame	IMO
Brendan Clarke	System Management
Andrew Sutherland	Market Generator
Ben Tan	Market Generator
Shane Cremin	Market Generator
Brad Huppatz	Market Generator (Verve Energy)
Corey Dykstra	Market Customer
Patrick Peake	Market Customer
Steve Gould	Market Customer
Stephen MacLean	Market Customer (Synergy)
Andrew Stevens	Market Customer/Generator
Jeff Renaud	Demand Side Management
Geoff Down	Contestable Customer
Paul Hynch	Observer (Office of Energy)
Wana Yang	Observer (Economic Regulation Authority)
Additional Attendees	
Aditi Varma	Minutes
Fiona Edmonds	Observer
Jenny Laidlaw	Observer
Greg Ruthven	Observer
Apologies	
Justin Payne	Contestable Customer

Item	Subject	Action
1.	**WELCOME AND APOLOGIES / ATTENDANCE** The Chair opened the first meeting of the Reserve Capacity Mechanism (RCM) Working Group (RCMWG) at 1:05pm. The Chair welcomed the members in attendance and noted apologies received from Justin Payne prior to the meeting. The Chair noted that consideration, development and assessment of changes to address the issues associated with the RCM were an important piece of work to be completed in 2012. The Chair acknowledged the level of interest shown by industry.	
2.	**HISTORY OF THE RCM** The Chair invited Mr Brendan Clarke, Dr Steve Gould, Mr Stephen MacLean and Mr Patrick Peake to inform the group about the history and guiding principles of the development of the Reserve Capacity Mechanism (RCM). Mr Peake informed the group that the RCM was originally driven by concern over electricity outages that were a consequence of the gas shortages in early 2004. He noted that it was believed at the time that an energy-only market would not have reliably met peak demand which is highly weather-dependent in Western Australia. Mr Clarke added that there was a fear that the price volatility that exists in an energy-only market could not only limit investment but also increase retailer risk. Mr MacLean added that it was decided that a centralised approach for the capacity market would be adopted to make the capacity product more tradeable. Mr MacLean added that bilateral contracts already existed in the energy market and were extended to the new capacity market. Mr MacLean further informed the group that the market was based on an auction process and a capped approach on capacity. It was much later during that process that the criteria for allocating capacity credits and therefore capping total capacity in the market were removed. Mr MacLean informed the group that the first version of the Wholesale Electricity Market (WEM) Rules differs from what was ultimately approved. The market had been redesigned in the interim to align with Western Power being a vertically integrated entity. Dr Gould confirmed that there was a period of discontinuity between the original design proposal and the approval of the final design. Mr Corey Dykstra reiterated that market design had been influenced by the peak events of February 2004 and that there seemed to be a political inclination towards having excess capacity at that time to deal with the concern caused by such events. Dr Gould added that the Office of Energy introduced the excess capacity factor some time after the implementation of Wholesale Electricity Market Rules. The Chair quoted the IMO Chairman Mr John Kelly's views on the original design taskforce - "From very early on, there was no real	

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	enthusiasm in the taskforce or the industry for a gross energy only market. High priority was placed on reliability and encouraging new plant investment. There was also a concern that price signals from an energy only market to incentivize the level of investment and reliability would have to be quite high. The small number of periods that would be affected implied that those high prices would not be palatable to various stakeholders". The Chair added that Mr Kelly's views were also that the Western Australian Electricity Market was not used to relying on private sector for investment and there was general unease around solely relying on energy market to incentivize this investment. The Chair further added Mr Kelly thought that the RCM had been successful. The RCM has been responsible for the capacity delivered in the market in recent years. Mr Kelly conveyed the Board's view that the processes surrounding the RCM were quite strong and there was confidence that capacity could be secured if required. The Board hoped to receive advice from the RCMWG to deal with present issues which had been identified. Mr MacLean briefly explained the original top-up and spill arrangements that were in place prior to market start. Dr Gould noted that the top-up and spill arrangements integrated quite well with the balancing market and the capacity market was in fact based on stand-by generation. The top-up and spill arrangement mapped very easily onto the new design. Mr Andrew Sutherland questioned if the IMO was concerned about the level of bilateral contracting to which the Chair replied that the rapid reduction in bilateral contracting in the market may signal that the regulated price of capacity may be overpriced. Mr Mike Thomas had also highlighted this concern. The Chair further added that the shift could also be driven by a change in strategy by Market Participants. Discussion ensued around auctions in capacity markets. Mr MacLean noted that price volatility was a concern for retailers as much as it was for generators. The Chair cited his concern that capacity auctions tend to result in a binary price, either close to zero or close to any price cap. Mr Thomas had highlighted this in his report. The Chair noted that having a regulated standard price ensured that technological innovation could enter the market whereas an auction-based market may not offer that. Mr MacLean suggested that the group should consider different auction approaches. Mr MacLean further explained the perverse consequence of an auction price of zero. Dr Gould agreed that perverse consequences also exist when retailers in the market try to game the market. There was further discussion about the adverse impacts of volatility in capacity prices, and the need for generators to have sufficient certainty to support long term investments. Mr MacLean and Mr Shane Cremin considered that capacity prices were less relevant to energy producing plant and more relevant to peaking plant. There was a discussion on the need to provide reliability at peak periods and on balancing political drivers against commercial drivers. Mr Dykstra noted that it was important to keep the objectives of the RCM in mind and that a solution based purely on economic efficiency	

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	may prove to not be implementable in practice. The Chair noted that the community seemed more accepting of load curtailment due to specific events such as hailstorms or bushfires, but not due to capacity shortfall on hot summer days. Mr Peake noted that it was even less palatable if shortfalls occur during the shoulder periods. Mr MacLean questioned the criteria used to plan for a 1-in-10 year peak demand event and ensuring reliability of supply. The Chair responded that the cost associated with not having enough capacity was significantly more than the cost associated with an extra unit of capacity. Mr Peake cited the Chamber of Commerce and Industry's work on significant economic losses that result due to power outages. Mr MacLean suggested that the group should consider reviewing the planning criteria for determining the Reserve Capacity Requirements as the IMO was not forming a separate group for that purpose. The Chair noted that the IMO would share the Scope of Work for that review with the RCMWG. Mr Peake and the Chair noted that the RCM is not just about costs, it also involved meeting market stakeholder expectations that have been built up over the years. There was a discussion around the competing nature of the Wholesale Electricity (WEM) Market Objectives. Mr Cremin noted that stakeholder expectations change over time. He cited the black outs in 2004 and shortages experienced in 2008 to note that the price must be dynamic and sensitive to stakeholder expectations. Mr Peake suggested that it might be useful to have a flexible Reserve Capacity Target. Mr MacLean noted that the discussions indicate the need to consider issues such as multiple prices for different types of capacity. Mr Cremin noted that the group should not get too focussed on differential capacity prices because they already exist to some degree as a result of the contractual nature of markets. Mr MacLean reiterated that Mr Thomas had also suggested that a dynamic capacity price should be considered in conjunction with a dynamic refund regime.	
3.	**DEFINITION OF CAPACITY** The Chair invited comments on the working definition of capacity provided in the IMO's paper. Mr Dykstra noted that the paper was useful but added that he was interested in assessing the characteristics of capacity in terms of what it provides to the market. The Chair proposed that the issue of differential characteristics of capacity should be dealt with after adequate consideration had been devoted to understanding what capacity actually is. He suggested that it was important as a first step to recognize the need to deal with capacity as a homogeneous product before its characteristics are discussed. Mr MacLean suggested that it would be important to consider both issues together because there was a danger of losing some level of economic efficiency if differential capacity prices were not considered. The Chair noted that there was also a risk of losing technological innovation by overly refining the price of capacity. Mr MacLean added that different approaches to defining capacity and its characteristics should be considered and that he would	

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	put forth some examples for the group to consider as work progressed. Mr Cremin highlighted that homogeneity in the capacity market did not exist presently as the market dealt with capacity resources from differing sources differently. The challenge was to decide if the Market Rules should apply discount factors depending on the technological features of different capacity resources or should the market be allowed to set the price. Mr Andrew Stevens proposed a definition of capacity that differentiates generation and DSM resources. He suggested that DSM effectively reduced the level of peak demand which should ideally translate into cost savings as a reduced level of generation capacity would then be required to serve the potential reduced demand level. The Chair queried as to how the market would incentivize the DSM owners to reduce their demand to which Mr Stevens replied that differential capacity and energy payments should be made. Mr Jeff Renaud argued that Mr Stevens' point actually implied a higher price for DSM. Mr MacLean added that efficiency gains could be made by pricing DSM lower as it is used less frequently and has a lower fixed cost than generation capacity. Mr Dykstra clarified that the level of peak demand would technically remain the same regardless of whether DSM is dispatched as the system demands would not have changed. At this point there was a discussion on the availability of DSM for limited periods during the year. The Chair responded that going forward DSM would likely be dispatched more frequently if there were no operational impediments in doing so. The group discussed the value provided to the market by DSM. Mr MacLean observed that DSM provided a lower cost product to the market. Mr Tan highlighted that the market must price the product according to the value it delivers. At this point the Chair noted that while there was some merit to the point about limited availability of DSM, it was offset to some extent by the high level of reliability it provided. Mr Sutherland highlighted the difference between generators and DSM with regard to the penalties for non-performance. In support of his argument, he compared the magnitude of lost revenue for DSM with capacity refunds for generators in the event of non-performance. Mr Renaud highlighted that costs were irrelevant and attention must be paid to the value provided to the market by DSM. The Chair stressed that it was important to understand the difference between cost and value. Mr Cremin observed that the value propositions of different capacity resources were different. He gave an example of capacity offered by a baseload generator at all times versus capacity offered by DSM at peak times. Mr Sutherland believed that given different availability factors, it seemed that differential pricing would be the best way forward. The Chair considered that capacity resources should be remunerated at the same level because the product they provide is equivalent. Mr Cremin used the example of a gross energy pool market to make the point that in a market situation, retailers would use the cheapest option to hedge their risk. This implied that retailers would contract for DSM rather than a peaking generator	

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	because the price would be applied differently. Mr MacLean agreed that such a price signal did not exist in the RCM. He further added that alternative approaches such as those offered by the New York- ISO capacity market should be evaluated with a degree of simplification. Mr Cremin concluded even if capacity was considered a homogeneous product, it was important to recognize that there is a misallocation of revenues to different technologies because of the absence of a market mechanism. Mr MacLean offered to present to the group different approaches to the treatment of this matter. Mr Stevens re-raised his point that peak demand should exclude the sum of the reductions that demand side options are willing to offer in the market at any time. The Chair brought the members' attention to the value of lost load and the significant cost of load-shedding to the economy. Mr Greg Ruthven also explained using an example that dispatched DSM capacity still constitutes demand though this demand has been served in a different manner. Mr Peake added that the capacity price worked as an insurance to cover the 1-in-10 year event peak demand forecast and it was possible that the value of that capacity would reduce significantly as the actual requirement became evident closer to the delivery year. This volatility in price would create risks for investment. Mr Dykstra focused members' attention on the definition provided in the paper and suggested that the group should begin by adopting a homogenised concept of capacity and then re-evaluating this definition at a later date. The Chair agreed with Mr Dykstra. The Chair asked if the members supported this approach and the members agreed.	
4.	**ISSUES FOR CONSIDERATION / PRIORITISATION** The Chair introduced various issues for prioritisation. The Chair noted that significant amount of work had already been done on the dynamic Reserve Capacity refund regime. The capacity refunds design that was recommended during the Market Evolution Project process would be presented for the group's consideration. Mr Sutherland, Mr MacLean and Mr Dykstra noted that there were certain issues with the design of the refund regime that should be revisited as the report did not address them adequately. On the impact of surplus capacity, Mr Dykstra suggested that a whole package of issues such as price volatility and investment uncertainty should be evaluated and not just price adjustments alone. The Chair added that since The Lantau Group report was completed, the Maximum Reserve Capacity Price (MRCP) had been determined and this price reduction should be taken into consideration. The Chair confirmed that Mr Thomas would be invited to revisit various recommendations. Discussion on the reasons for oversupply of capacity in the market ensued. Mr Cremin argued that the problem was not excess capacity itself but the manifestation of a number of factors that created the incentive for oversupply. He cited transmission costs, unconstrained network among other factors in support of his argument.	

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	The Chair agreed that the Reserve Capacity Price was a key issue particularly in last couple of years, driven by the calculation of the transmission connection cost in the MRCP. The Chair opined that the situation could have been quite different if say, large loads indeed connected before the Global Financial Crisis or DSM had not developed in the market. Mr Renaud argued that there is a finite opportunity for DSM to enter into a market. DSM providers in the market have not reacted to price signals but rather market opportunities. He suggested that in most international markets, DSM is generally at about 8-9% of total capacity. Mr MacLean noted that excess capacity was a problem because the price was not competitively set. He suggested that the discount factor that should create a price signal was too sluggish to limit over supply. There was a discussion among members on bilateral contracting and sensitivity of the MRCP. The Chair pointed out that Mr Thomas's suggestion that the MRCP is too high may be demonstrated by the fact that no one had incurred transmission costs that were included in previous MRCP determinations and inlet cooling for thermal generators had not previously been taken into account in MRCP determinations. He also added that The Lantau Group report did not take into account the new reduced MRCP. Mr Tan noted that the level of bilateral contracting was also reducing and the effect of pre-existing contracts was wearing off. Mr Cremin added that the capacity market was an artificial market. Mr Peake argued that in real terms, the total capacity was declining over the years. Mr Renaud added that excess capacity in the WEM included excess baseload generation capacity, not only DSM or peaking generation capacity. The Chair noted that external factors (e.g., renewable incentives) and not just market forces, acted as drivers for the situation of oversupply. The Chair asked if members were comfortable with the prioritisation of issues presented. The Chair confirmed that IMO will invite Mr Mike Thomas to present a paper on oversupply at the next meeting. Mr Tan asked for inclusion in this paper of a direct control mechanism by the IMO on the amount of capacity entering the market. Mr Brad Huppatz asked the data on bilaterally contracted capacity to be updated as the uncontracted proportion may have reduced since the previous results were presented. Mr Peake voiced two concerns around the effects of an excessive drop-off in the MRCP on investment certainty and potential gaming in the market because of the size of the single largest retailer. Mr Huppatz noted that keeping the classification of Outages in the out-of-scope list would limit the amount of attention given to the dynamic refund regime. The Chair suggested that the IMO would be happy to share the recommendations of the Outage Planning Review. The Chair noted his encouragement for greater transparency around Outages in the market. Mr Andrew Sutherland queried if Supplementary Reserve Capacity (SRC) would be considered in the discussions. The Chair welcomed him to put it on the agenda as the group's work progressed. This was followed by a discussion on the creation of a SRC fund. Mr Sutherland asked if the MRCP methodology would be reviewed. The Chair confirmed that the MRCPWG will be reconstituted to review specifically, the determination of the Weighted Average Cost of Capital. He confirmed that this work would however, not affect the MRCP	

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	determination for this year. Mr MacLean queried if the scope of work for the forecasting methodology would be shared with this group. The Chair confirmed that it would. *Action: The IMO to invite Mr Mike Thomas to the next meeting to present a paper on the oversupply of capacity and to include the requests of the members on a)* a direct control mechanism by the IMO on the amount of capacity entering the market *and b)updating data on bilateral contracting of capacity* *Action: The IMO to share scopes of work for the five-yearly review of the Planning Criterion and the IMO's forecasting processes*	
5	**PROPOSED RCMWG MEETING DATES 2012** The IMO tabled proposed alternative RCMWG meeting dates to those distributed previously in the meeting papers, to ensure there was no overlap with the Gas Advisory Board's scheduled meetings. Working Group members were generally comfortable with the revised dates. Mr MacLean requested if meeting start times could be changed to 2.30pm. The Chair confirmed that the IMO will try to accommodate Mr MacLean's request.	
6	**GENERAL BUSINESS** No general business was discussed	
7	**CLOSED** The Chair thanked all members for attending and declared the meeting closed at 3.45pm.	

Independent Market Operator

Reserve Capacity Mechanism Working Group (RCMWG)

Agenda item 4: RCMWG Action Points

Legend:

Shaded	Shaded action points are actions that have been completed since the last RCMWG meeting.
Unshaded	Unshaded action points are still being progressed.

#	Action	Responsibility	Meeting arising	Status/Progress
1	The IMO to invite Mr Mike Thomas to the next meeting to present a paper on the oversupply of capacity and to include the requests of the members on a)direct control mechanism by the IMO on the amount of capacity entering the market and b)updating data on bilateral contracting of capacity	IMO	February	Completed
2	The IMO to share scopes of work for the five-yearly review of the Planning Criterion and forecasting processes	IMO	February	Completed.

Agenda Item 4. Actions Arising

1. BACKGROUND

At the RCMWG meeting on 15 February 2012, the IMO presented a paper on RCM issues for consideration/prioritisation. During that discussion, it was agreed that the IMO would share the scopes of work of five-yearly reviews of the Planning Criterion and forecasting processes with the RCMWG members.

The IMO has appended the scopes of work for the five-yearly reviews of the Planning criterion and forecasting processes.

2. RECOMMENDATION

The IMO recommends that the RCMWG:

- Note the scopes of work appended

Scope of Work:
Five-Yearly Review of Forecasting Processes used for SWIS

1. OVERVIEW OF REQUIREMENTS

Every year, the Independent Market Operator (IMO) prepares a Statement of Opportunities Report[1] that includes forecasts of maximum electricity demand and energy consumption within the South West interconnected system (SWIS).

The Wholesale Electricity Market (WEM), which operates within the SWIS, includes a Reserve Capacity Mechanism (RCM) that facilitates the provision of adequate generation and demand side management (DSM) capacity to meet the defined reliability criteria. These criteria define the Reserve Capacity Target (RCT), which is determined from the forecasted maximum demand with an appropriate reserve margin. As a consequence, forecast accuracy is important in ensuring adequacy of supply.

Since the commencement of the WEM, forecasts have been prepared for the IMO by the National Institute of Economic and Industry Research (NIEIR). In addition to this, the IMO commissioned Monash University in 2011 to provide additional forecasts. The IMO did not include the Monash forecasts in the 2011 Statement of Opportunities due to some structural issues with their forecasts. The IMO has subsequently worked with Monash with the aim of addressing these issues, and is evaluating the viability of using two forecasting agencies.

The Market Rules, under which the IMO administers the WEM, require the IMO to undertake regular (five yearly) reviews of its demand forecasting process. The IMO is now seeking the services of a suitably qualified consultant to undertake an independent review of the forecasting processes employed by the IMO and its forecasting agencies, NIEIR and Monash.

The objectives of this review are to:

- Determine whether the demand forecasts are being prepared in accordance with best practice in terms of process and methodology;
- Review the accuracy of forecasts and compare this performance with that of comparable agencies;
- Identify practical ways in which the preparation of these forecasts can be enhanced to improve their accuracy;
- Identify any methods or mechanisms that the IMO and its forecasting agencies can implement to better predict the impact of factors not present in historical demand data, which may include new large loads, increasing penetration of solar photovoltaic systems and energy efficiency measures; and
- Recommend changes to the Market Rules or Market Procedures where required to enable improved demand forecasting, including an assessment of the changes against the market objectives.

[1] See http://www.imowa.com.au/soo.

A key feature of this review is that it is to be undertaken in close liaison with the IMO. In addition, regular progress updates need to be provided to the Market Advisory Committee (MAC), which comprises of various Market Participants and other stakeholders. The IMO also expects to conduct at least one stakeholder workshop. The tenderer must make adequate provision for this liaison with stakeholders.

2. ABOUT THE IMO

2.1 Functions of the IMO

The IMO is a Government-owned, not-for-profit, statutory corporation, that administers and operates the Wholesale Electricity Market in WA.

The IMO operates within a framework prescribed by the Wholesale Electricity Market Rules and two sets of regulations: the *Electricity Industry (Wholesale Electricity Market) Regulations 2004* and the *Electricity Industry (Independent Market Operator) Regulations 2004*.

The IMO's functions include:

- Operation of the Reserve Capacity Mechanism;
- Operation of the Short Term Energy Market and the balancing process;
- Publication of market information; and
- Processing of applications for participation, and for the registration, de-registration and transfer of facilities.

2.2 The IMO's Role In The Reserve Capacity Mechanism

The RCM ensures that sufficient generation and DSM capacity is available to meet the overall SWIS forecast peak demand. Both the Planning Criterion and the Long Term Projected Assessment of System Adequacy (LTPASA) play key roles in the RCM in determining the required level of capacity.

The RCM commenced in 2004 and operates on an annual basis. The market cycle commences in year *n* to secure reserve capacity for the 12 months from 1 October of year *n+2*. This 12-month period is called a Capacity Year. The associated acquisition of capacity and assignment of Capacity Credits has been completed for periods up to and including 2013/14 Capacity Year.

3. STATEMENT OF REQUIREMENTS

3.1 Background to this Request for Tenders

A key function of the IMO is to facilitate the provision of sufficient generation and DSM capacity onto the SWIS to meet the reliability criterion set out in the Market Rules. The processes to be followed by the IMO in fulfilling this obligation are set out in Chapter 4 of the Market Rules and include performing the LTPASA each year, in accordance with MR 4.5.10.

"4.5.10. The IMO must use the information ***(described in market rules 4.5.1 through 4.5.8)*** *assembled to:*

(a) Assess the extent to which the anticipated installed generation capacity and Demand Side Management capacity is capable of satisfying the Planning Criterion, identifying and capacity shortfalls in each Relevant Year in the Long Term PASA Study Horizon, for each of the following scenarios;

i. median peak demand assuming low demand growth;
ii. one in ten year peak demand assuming low demand growth;
iii. median peak demand assuming expected demand growth;
iv. one in ten year peak demand assuming expected demand growth;
v. median peak demand assuming high demand growth;
vi. one in ten year peak demand assuming high demand growth;

where the low, expected, and high demand growth cases reflect demand changes stemming from different levels of economic growth, with these being temperature adjusted to produce the one in ten year peak demand cases.

The IMO publishes two sets of electricity demand forecasts each year within the SOO. These forecasts cover:

- Annual electricity consumption, which is the amount of energy sent-out and consumed within the SWIS over a year and is measured in GWh; and
- Peak demand, which is the measure of the highest level of power consumption in any half-hour Trading Interval during the year and is measured in MW.

The peak demand forecast has played a particularly important role in determining the Reserve Capacity Requirement[2]. Forecasting errors may contribute to inefficient market outcomes:

- If peak demand is underestimated and less capacity is provided to the market, a capacity shortfall may arise that requires the IMO to procure short-term, supplementary reserve capacity. This is likely to result in higher costs to customers.
- If peak demand is overestimated and surplus capacity is provided to the market, customers will be required to fund additional capacity.

[2] The Reserve Capacity Target is determined for each year of the ten-year forecasting horizon. The Reserve Capacity Requirement is the specific Reserve Capacity Target determined for the Capacity Year commencing on 1 October, two years in the future.

The IMO's demand forecasting process is subject to review at least once in every five years, as required by Market Rules 4.5.15 to 4.5.18.

The last review was conducted in 2007, in which the IMO commissioned analysis by Frontier Economics[3]. Any proposed rule/procedure changes would need to be drafted as proposed market rule/procedure changes for consideration by the MAC.

3.2 Data provided to the IMO's forecasting agencies

The IMO prepares various data sets for its forecasting agencies.

- Historical demand: The IMO determines total SWIS demand from the total generation in each half-hour Trading Interval. This is primarily determined on a market sent-out basis, though is also prepared in a manner consistent with the earlier Generation Status Review (GSR) forecasts used by Western Power prior to disaggregation (including consideration of "behind-the-fence" consumption and generation). The IMO requires additional data from System Management in order to prepare the GSR data.
- Electricity sales by tariff: Synergy provides the IMO with aggregate electricity sales by tariff on a monthly basis. This can be used to apportion electricity consumption into usage classes, such as residential, business and public lighting.
- Temperature: Temperature data is provided by the Bureau of Meteorology for the Perth Metro and Perth Airport sites. Temperature-dependent electricity consumption is concentrated in and around the Perth metropolitan area.
- Existing major industrial customers: Consumption data for various major industrial customers is gathered for each half-hour Trading Interval. This is used for modelling industrial load, including consumption profiles for future industrial loads.
- New large loads: Due to the relatively small size of the SWIS, the addition of a new major industrial load can have a significant impact both on total demand and peak load. Consequently, the IMO researches future major industrial loads with projected peak consumption of 20MW or greater. This information is provided to its forecasting agencies. This research includes review of publicly available reports and discussions with the Western Power, government departments and the project developers themselves.

3.3 Forecasting agencies appointed by the IMO

The IMO has appointed NIEIR and Monash University to prepare demand forecasts. NIEIR and Monash are also the principal external agencies engaged in the preparation of demand forecasts for the Electricity Statement of Opportunities that is published by the Australian Energy Market Operator (AEMO)[4].

[3] Documentation from the 2007 review is available at http://www.imowa.com.au/rcreviews.
[4] The 2011 Electricity Statement of Opportunities is available at http://www.aemo.com.au/planning/esoo2011.html.

NIEIR

The core forecasting tool used by NIEIR is its national econometric model of the Australian economy. This provides projections of national economic growth using inputs from various statistical sources including the Australian Bureau of Statistics and the Australian Taxation Office.

The national economic projections are used as input into a state economic projection model which provides an estimate of Gross State Product and other indicators. The state model is then further disaggregated into the statistical subdivisions that make up the region served by the SWIS.

The economic forecasts of the SWIS include projections of population growth, dwelling stock composition and industry growth by sector. This portion of the forecasting system then links the SWIS regional economic forecast with electricity use based on assumptions about appliance penetration and efficiency, weather conditions and separate forecasts of major industrial loads.

Forecasts of summer maximum demands are developed using an approach that disaggregates historical demand into various classes – non-temperature-sensitive load, temperature-sensitive load (dominated by air-conditioning, refrigeration and ventilation demand), major industrial load and the impact of embedded generation. Demand growth in each demand class is influenced by different factors, so future demand is forecast separately by class and aggregated.

Monash University

Monash University prepares its demand forecasts using its Monash Electricity Forecasting Model.

Monash begins by modelling the relationship between various input parameters and electricity demand. Input parameters are classed into those that have a significant impact on half-hourly demand (such as temperature and the day of the week) and those that have a significant impact on annual consumption (such as economic growth and electricity prices).

Monash has then used economic growth and demographic forecasts developed by KPMG Econtech as an input into its annual demand prediction.

Monash also develops a large number of input temperature scenarios for its half-hourly demand simulation, using the technique of "bootstrapping". This technique involves randomly re-sampling historical data, while preserving any typical daily or seasonal trends and the inherent correlation between sequential data points. Monash has generated the equivalent of 1000 years worth of temperature profiles, which allow for a probability distribution of outcomes to be generated.

A series of ex ante and ex post forecasts are then developed to evaluate the performance of the forecasting model.

3.4 Specification Requirements

The services of a suitably qualified consultant are being sought to undertake a review of the forecasting process utilised by the IMO and its forecasting agencies. This review is to:

- Determine whether the forecasting methodologies are consistent with best practice in terms of process and methodology;

- Review the accuracy of the National and State economic forecasts and compare this performance with that of other Australian economic forecasting agencies;
- Review the accuracy and error bounds of the forecasting methodologies used by the IMO's forecasting agencies and contrast this with forecasting performed in other electricity jurisdictions;
- Identify practical ways in which the preparation of these forecasts can be enhanced to improve their accuracy, or any other factors that may require substantial changes to be made to forecasting processes over the next five years;
- Identify any methods or mechanisms that the IMO and its forecasting agencies can implement to better predict the impact of factors not present in historical demand data, which may include new large loads, increasing penetration of solar photovoltaic systems and energy efficiency measures;
- Estimate the costs to implement any recommended changes to processes or methodologies; and
- Recommend changes to the Market Rules or Market Procedures where required to enable improved demand forecasting, including an assessment of the changes against the market objectives.

The IMO has yet to decide whether to appoint Monash to prepare forecasts for 2012. Tenderers are requested to provide two price schedules for this work:

- Review of the processes employed by the IMO and NIEIR only; and
- Review of the processes employed by the IMO, NIEIR and Monash.

3.5 Stakeholder Liaison

The Market Rules stipulate that the review of the forecasting process used within the LT PASA is to incorporate a public consultation process with stakeholders. The procedural steps are set out in section 4.5 of the Market Rules, in particular clauses 4.5.15 to 4.5.18. The public consultation period will run for at least 20 business days. Any proposed changes to the Market Rules or any Market Procedure are to be progressed in accordance with clause 4.5.19.

In addition to these requirements, the IMO will be liaising with the MAC during the review and expects to conduct one stakeholder workshop. A tenderer must make adequate provision for liaison with the IMO and a presentation at one MAC meeting during this study. All meetings and workshops are to be held in Perth.

The work to be undertaken by the successful tenderer in response to this RFT covers only the review of the LT PASA Process. However, the successful tenderer will be expected to keep up-to-date with the recommendations from the parallel review of the Planning Criterion and to reflect this within its reports.

3.6 Reserve Capacity Mechanism Working Group

The Reserve Capacity Mechanism Working Group (RCMWG) has been constituted by the MAC to consider, develop and assess changes to the Market Rules associated with various issues that have been identified in relation to the Reserve Capacity Mechanism. This work will take place during 2012. The issues to be considered by the RCMWG are:

- The definition of capacity;
- Issues that impact surplus capacity
  - The consistent capacity surpluses secured in the Wholesale Electricity Market
  - The pricing of capacity in oversupply conditions
  - The additional costs imposed on the market as a result of surplus capacity
- Performance requirements for reserve capacity
  - The role of DSM in the RCM, including consideration of the availability limits for DSM
  - The fuel requirements imposed on generation capacity providers
- The allocation of capacity costs to Market Customers
- The impact of forecasting inaccuracy on the RCM
- The alignment of the implementation of a dynamic Reserve Capacity refund regime and the potential changes to the RCM resulting from the deliberations of the RCMWG
- The timeline and scope of a periodic review of the RCM

The successful tenderer will be expected to keep up-to-date with the deliberations and progress of the RCMWG, and to reflect this within its reports. A presentation of the successful tenderer's draft findings to the RCMWG may be required once the Draft Report is nearing completion.

3.7 Timeframe

This review is required to be completed by 30th November 2012. In developing a project schedule, the proponent must allow sufficient time for consultation with the IMO and the MAC (in Perth). As a minimum, the IMO anticipates that consultation between the successful tenderer and the IMO will be required:

- Immediately following award of the contract to discuss the initial public comments and finalise the Consultant's work plan;
- To discuss the Consultant's initial findings prior to development of the Draft Report;
- To discuss the Consultant's Draft Report; and
- To discuss public comments and develop the Final Report.

A proposed timeframe for each of the different project stages is captured in the table below.

Process Stage	Expected Date
RFT issued	22 Feb 2012
Applications close	21 Mar 2012
Contract/ Tenderer selection	4 Apr 2012
Initial consultation	Week starting 9 Apr 2012
Draft Report to IMO	30 May 2012
IMO publishes Draft Report	29 Jun 2012
Presentation to MAC	11 Jul 2012
Public submissions close	27 Jul 2012
IMO & Tenderer consultation and Final Report preparation	31 Aug 2012
IMO publishes Final Report	16 Oct 2012

Scope of Work:
Five-Yearly Review of the Planning Criterion in SWIS

1. OVERVIEW OF REQUIREMENTS

The Wholesale Electricity Market Rules define the Planning Criterion to be used for preparation of the Long Term Projected Assessment of System Adequacy (LTPASA) within the South West interconnected system (SWIS) in Western Australia. The Planning Criterion sets the minimum acceptable level of generation and Demand Side Management (DSM) capacity to ensure that the risk of unserved demand is within acceptable limits.

The Independent Market Operator (IMO) is required by the Market Rules to undertake a review of the Planning Criterion at least once every five years.

The Planning Criterion currently has two components:

- A defined scenario that sets out a reserve requirement which must be available during system peak demand; and
- A probabilistic assessment of expected unserved energy.

The IMO is now seeking proposals from suitably qualified organisations to undertake a review of this criterion. The successful tenderer will be required to propose a reliability criterion to be applied within the SWIS for the next five years.

As part of this work, the Independent Market Operator (IMO) is seeking to establish a contract to:

- Review the practices in other power systems;
- Review and analyse the performance of existing and planned generation facilities, including consideration of plant outages and reliability of output;
- Assess factors that are specifically related to the SWIS;
- Perform a cost benefit study on the effects on stakeholders of a variety of levels of capacity;
- Recommend an appropriate reliability criterion, taking into account the cost benefit study;
- Perform an assessment of the recommended reliability criterion against the market objectives, noting the competition that exists between (and within) objectives (for example, between "*reliable production and supply of electricity*" and the objective to "*minimise the long-term cost of electricity*");
- Provide the definition of, and a methodology to determine, each parameter used in calculating the Reserve Capacity Requirement; and
- Determine and assess the commercial and system impacts of implementing any recommended changes to the criterion.

A key feature of this review is that it is to be undertaken in close liaison with the IMO. In addition, regular progress updates need to be provided to the Market Advisory Committee (MAC), which comprises of

various Market Participants and other stakeholders. The IMO also expects to conduct up to two stakeholder workshops. The tenderer must make adequate provision for this liaison with stakeholders.

The IMO notes that the scope of work in this review requires both an engineering/technical analysis of system reliability and an economic analysis of the costs and benefits of various capacity levels. The IMO will accept offers where the Tenderer proposes to sub contract a portion of this scope.

2. ABOUT THE IMO

2.1 Functions of the IMO

The IMO is a Government-owned, not-for-profit, statutory corporation, that administers and operates the Wholesale Electricity Market in WA.

The IMO operates within a framework prescribed by the Wholesale Electricity Market Rules and two sets of regulations: the *Electricity Industry (Wholesale Electricity Market) Regulations 2004* and the *Electricity Industry (Independent Market Operator) Regulations 2004)*.

The IMO's functions include:

- Operation of the Reserve Capacity Mechanism;
- Operation of the Short Term Energy Market and the balancing process;
- Publication of market information; and
- Processing of applications for participation, and for the registration, de-registration and transfer of facilities.

2.2 The IMO's Role In The Reserve Capacity Mechanism

The Reserve Capacity Mechanism (RCM) ensures that sufficient generation and Demand Side Management (DSM) capacity is available to meet the overall SWIS forecast peak demand. Both, the Planning Criterion and the LTPASA play key roles in the RCM in determining the required level of capacity.

The RCM commenced in 2004 and operates on an annual basis. The market cycle commences in year n to secure reserve capacity for the 12 months from 1 October of year n+2. This 12-month period is called a Capacity Year. The associated acquisition of capacity and assignment of Capacity Credits has been completed for the periods up to and including 2013/14 Capacity Year.

3. STATEMENT OF REQUIREMENTS

3.1 Background and Market Rules

Market Rule 4.5.9 sets the Planning Criterion that the IMO must use in preparing the Long Term Projected Assessment of System Adequacy (LT PASA).

"4.5.9. The Planning Criterion to be used by the IMO in undertaking a Long Term PASA study is that there should be sufficient available capacity in each Capacity Year during the Long Term PASA Study Horizon to:

(a) meet the forecast peak demand (including transmission losses and allowing for Intermittent Loads) supplied through the SWIS plus a reserve margin equal to the greater of:

i. 8.2% of the forecast peak demand (including transmission losses and allowing for Intermittent Loads); and

ii. The maximum capacity, measured at 41˚C, of the largest generating unit;

while maintaining the Minimum Frequency Keeping Capacity for normal frequency control. The forecast peak demand should be calculated to a probability level that the forecast would not be expected to be exceeded in more than one year out of ten; and

(b) limit expected energy shortfalls to 0.002% of annual energy consumption (including transmission losses."

The Planning Criterion is subject to review at least once in every five years, as required by Market Rules 4.5.15 to 4.5.18.

The last review was conducted in 2007, in which the IMO commissioned analysis by CRA International[1]. This review recommended only minor changes from the original Planning Criterion, which in turn was based on the criterion used by Western Power prior to the commencement of the WEM. The 0.002% unserved energy criterion reflects the target levels that were being used within the National Electricity Market and other systems throughout the late 1990s.

The Planning Criterion is due for review again in 2012. Any proposed changes would need to be drafted as Market Rule Change Proposals for consideration by the Market Advisory Committee (MAC).

The IMO is undertaking a parallel review of the forecasting process used within the LT PASA process. The work to be undertaken by the successful tenderer covers only the review of the Planning Criterion.

3.2 Reserve Capacity Mechanism Working Group

The Reserve Capacity Mechanism Working Group (RCMWG) has been constituted by the MAC to consider, develop and assess changes to the Market Rules associated with various issues that have been identified in

[1] Documentation from the 2007 review is available at http://www.imowa.com.au/rcreviews.

relation to the Reserve Capacity Mechanism. This work will take place during 2012. The issues to be considered by the RCMWG are:

- The definition of capacity;
- Issues that impact surplus capacity
  - The consistent capacity surpluses secured in the Wholesale Electricity Market
  - The pricing of capacity in oversupply conditions
  - The additional costs imposed on the market as a result of surplus capacity
- Performance requirements for reserve capacity
  - The role of DSM in the RCM, including consideration of the availability limits for DSM
  - The fuel requirements imposed on generation capacity providers
- The allocation of capacity costs to Market Customers
- The impact of forecasting inaccuracy on the RCM
- The alignment of the implementation of a dynamic Reserve Capacity refund regime and the potential changes to the RCM resulting from the deliberations of the RCMWG
- The timeline and scope of a periodic review of the RCM

The successful tenderer will be expected to keep up-to-date with the deliberations and progress of the RCMWG, and to reflect this within its reports. A presentation of the successful tenderer's draft findings and recommendations to the RCMWG may be required once the Draft Report is nearing completion.

3.3 Specification Requirements

3.3.1 Review Objectives

The Planning Criterion that is applied within the SWIS must support the market objectives set out in the Electricity Industry Act:

- To promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;
- To encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors;
- To avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;
- To minimise the long-term cost of electricity supplied to customers from the South West interconnected system; and
- To encourage the taking of measures to manage the amount of electricity used and when it is used.

In meeting these market objectives, the review should recommend a Planning Criterion that:

- Ensures that sufficient capacity is provided to ensure that demand is met, taking into consideration that a capacity shortfall that results in involuntary load shedding can have more severe financial impacts than an excess of capacity in the market;
- Provides an efficient balance between the costs of providing sufficient capacity and potential customer costs arising from supply shortfalls;
- Identifies the level of outage that is considered reasonable for an isolated network like the SWIS;
- Takes into account the reliability issues arising from other specific features of the SWIS; and
- Is expected to remain valid until the next review which is required to be undertaken no later than 2017.

3.3.2 Review of Practice in Other Power Systems

This study is to include a review of the reliability criteria that are currently being by electricity markets in other jurisdictions. This study should:

- Identify any significant local issues that may have led to these criteria being adopted;
- Identify whether there is a reliability criterion that can be considered as an international standard; and
- Consider the suitability of criteria used in other electricity systems for the SWIS. Factors to be considered should include, but are not limited to:
  - The cost and complexity of introducing such a criterion (or standard); and
  - The improvement provided by this criterion compared to the current Planning Criterion.

3.3.3 Review and Analysis of Existing Plant Performance

This study is to include analysis of the forced and planned outage rates of generation plant in service within the SWIS, including the breadth and the depth of these outages.

Estimates should be developed of outage rates that may be expected for generation plant that is likely to be installed within the SWIS over the next five years. The typical variability in this data that may be expected should also be estimated, and the possible impact of changes to the SWIS load profile on opportunities for scheduled maintenance should be assessed.

The outage analysis should be used to determine whether the recommended Planning Criterion should be based on an average actual forced and planned outage rates or an alternative measure.

3.3.4 Review of the "Defined Scenario" Criterion

This study is to consider whether a "Defined Scenario" criterion is still appropriate within the Planning Criterion and, if so, to define and review the scenario.

- Consider the individual and cumulative risk to the power system arising from various combinations of demand and plant outages;
- Consider whether other factors, such as outage scheduling during off-peak and shoulder periods, fuel diversity or fuel supply restrictions, should be taken into account in defining the scenario, and if so how;
- Determine whether a single scenario, based on the 1 in 10 year peak demand, is appropriate; and
- Determine what factors, such as generator outage rates, may require the IMO to reassess the defined scenario.

3.3.5 Impact Analysis

The study must include a cost-benefit study on the effects on stakeholders of a variety of levels of generation adequacy, as well as the costs and benefits associated with changing the Planning Criterion compared with retaining the existing criterion. This assessment is to include, but is not limited to:

- An assessment of the increase or reduction in plant capacity costs, and where these would be incurred, as a result of varying the Reserve Capacity Target;
- An estimate of the costs and benefits accruing to Market Participants as a result of changed levels of unserved energy;
- An estimate of the level of involuntary load shedding (not including the curtailment of DSM capacity) that may be experienced if a particular criterion is adopted. This should be identified in terms of:
    - The amount of load that may be shed;
    - The duration of various amounts of load shedding; and
    - The frequency of load shedding that may be expected during a typically hot year.

  This analysis must consider load shedding that may occur as a result of typical levels of plant outages during peak demand periods. It should also consider whether other situations, such as the combination of scheduled and unscheduled outages occurring during periods of moderate demand, may lead to load shedding.

3.4 Stakeholder Liaison

The Market Rules stipulate that any review of the Planning Criterion is to incorporate a public consultation process with stakeholders. The procedural steps are set out in section 4.5 of the Market Rules, in particular clauses 4.5.15 to 4.5.18. The public consultation period will run for at least 20 business days. Any proposed change to the Planning Criterion is to be progressed through the process set out in clause 4.5.19. The successful tenderer will be expected to provide assistance to the IMO in consideration of, and response to, public submissions, and at up to two stakeholder workshops.

In addition to these requirements, the IMO will be liaising with the MAC during the review. A tenderer must make adequate provision for presentation at up to two meetings of the MAC throughout this study. All meetings and workshops are to be held in Perth.

3.5 Timeframe

This review, including the IMO's final report in respect of the review, must be completed by November 2012. In developing a project schedule, the proponent must allow sufficient time for consultation, in Perth, with the MAC. As a minimum, the IMO anticipates that consultation between the successful tenderer and the IMO will be required:

- Immediately following award of the contract to discuss the scope of work and finalise the Consultant's work plan.
- To discuss the Consultant's initial options prior to the commencement of detailed modelling.
- To discuss the Consultant's Draft Report.
- To discuss public comments and develop the Final Report.

A proposed timeframe for each of the different project stages is captured in the table below.

Process Stage	Expected Date
RFT issued	22 Feb 2012
Applications close	21 Mar 2012
Contract/ Tenderer selection	4 Apr 2012
Initial consultation with IMO	Week starting 9 Apr 2012
Presentation to MAC	9 May 2012
Draft Report to IMO	13 Jun 2012
IMO publishes Draft Report	29 Jun 2012
Stakeholder workshop	Week starting 2 Jul 2012
Public submissions close	27 Jul 2012
IMO & Tenderer consultation and	31 Aug 2012

Final Report preparation	
Presentation to MAC	12 Sep 2012
IMO publishes Final Report	16 Oct 2012

Report

Prepared For:

The Reserve Capacity Mechanism Working Group

RCM Options Discussion for the RCMWG

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Date: 15 March 2012

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1. OVERVIEW

In this paper we briefly review the current excess reserve capacity situation and make a connection between the Reserve Capacity Mechanism (RCM) and the recently finalised revisions to the Maximum Reserve Capacity Price (MRCP). We describe options for improving the RCM by tuning the formula that determines the Reserve Capacity Price (RCP) to be more responsive to market conditions, as has been recommended by the IMO Board. We also discuss ways to restrict the supply of capacity credits in order to mitigate excess investment in the WEM, including options that rely more heavily on bilateral contracting and limited (probably IMO-facilitated) trading.

1.1. WHAT CAUSES EXCESS RESERVE CAPACITY

We define excess reserve capacity as any reserve capacity that contributes materially less value to the provision of system reliability than what it is being paid. Put differently, if capacity were paid only what it were "worth", there would be no incentive to sustain any material amount of "excess" reserve capacity. In theory this is a simple definition. In practice, numerous complications must be considered, including the difficulty of measuring the specific value of capacity accurately and in a timely manner. These complications are arguably more challenging in a small, lumpy market like the WEM in which supply and demand can change quickly and there is no recourse to neighbouring markets.

The amount of excess reserve capacity in the WEM at any point in time is the product of a complex mix of supply and demand-side forces:

- On the supply side, investors continuously adjust their investment plans based on their expectations of future conditions. The amount of excess reserve capacity in the WEM is also the product of legacy conditions (such as the pre-global financial crisis economic boom), as well as historical programmes (no longer in force), such as the Displacement Mechanism in the original Vesting Contract and the earlier Schedule 7 requirements that required Western Power Corporation to tender for new capacity; and
- On the demand side, current and projected demand will generally not be the same as the level that was previously expected or projected. Market conditions change all the time. The global financial crisis and subsequent global economic slowdown exemplify disruptive forces that caused demand to be much lower than previously forecast.

The challenge of adjusting supply and demand using a combination of administrative mechanisms and market forces can be analogised to a person walking a dog. Like a person walking a dog, there is the path of the person and the path of the dog. Over time, the person and dog both must get to the same place, just as supply and demand must align reasonably over the longer term to conserve costs while maintaining reliability. But the relative path of each can look very different in the short term. The dog will wander to the left and to the right, and sometimes ahead and sometimes behind. If the leash is too short, the dog fights against the leash. If the leash is too long, the person fights against the dog, or the dog may fall behind or get stuck around a tree.

A well-functioning electricity market has mechanisms (both market-based and administrative) that work a bit like an effective leash. The relationship of supply and demand is, naturally, always in flux, just like the relative position of the person and the dog on a walk. Supply should not outpace demand for too long without becoming unprofitable. Supply should not run behind demand without a strong new investment "signal", else reliability will be compromised. But how long should the leash be? In normal, competitive, markets for most goods and services we generally do not worry about this question. In those cases, the leash is simply Adam Smith's invisible hand. But in the WEM, or any modern electricity market, adequacy, security and reliability do not just happen without mechanisms and signals to manage them. In the WEM, the RCM is the leash. If the RCM does not adjust with sufficient responsiveness and dynamism, the amount of reserve capacity can vary widely, imposing excess costs or reduced reliability.

1.2. THE RCM AS AN ADMINISTRATIVE MECHANISM

The RCM is an administrative mechanism built around the concept of a Reserve Capacity Requirement (RCR), a Maximum Reserve Capacity Price (MRCP) and a Capacity Credit. Capacity Credits are allocated to facilities certified by the IMO in a process which begins around three years prior to the start of the Capacity Year in question. The IMO reviews sources of Capacity Credits to determine whether they can be relied on to provide capacity by the time required. The IMO categorises facilities as either "committed" or "proposed". When undertaking this review, the IMO considers a range of factors, including whether the facility has entered into irrevocable commitments.[1]

Each Market Customer must secure Capacity Credits to meet its Individual Reserve Capacity Requirement (IRCR), which is based on its expected contribution to peak demand. Market Customers can procure Capacity Credits bilaterally from Capacity Credit suppliers. The IMO pays an administered price, the RCP, to anyone with Capacity Credits that have not been traded bilaterally. Stakeholders may find it advantageous to rely on the IMO as the market maker in the event that there are too many Capacity Credits (more than are needed to cover all requirements), or in the event that the transactions cost of dealing with the IMO is less than that associated with contracting bilaterally, or in the event that a bilateral transaction is not able to be reached.

1.3. EVALUATING CHANGES TO THE RCM AGAINST THE MARKET OBJECTIVES

The Market Objectives provide guidance for evaluating whether the RCM works effectively and guidance in relation to possible adjustments to the RCM. The Market Objectives are to:

(a) promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;

1 As provided for in Appendix 3 of the Market Rules.

(b) encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors;

(c) avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;

(d) minimise the long-term cost of electricity supplied to customers from the South West interconnected system; and

(e) encourage the taking of measures to manage the amount of electricity used and when it is used.

If the RCM attracts or supports more capacity than is required, then it would get lower marks for meeting Market Objective (d). On the other hand, more capacity may be argued, in some instances, to assist the achievement of Market Objective (b) by supporting greater competition in the energy market. Similarly, a failure of the RCM to attract sufficient capacity would also result in a costly failure of the WEM, compromising virtually all of the Market Objectives, except perhaps (e). Clearly, evaluating a specific change to the RCM (or even its current performance) against the Market Objectives involves balancing a number of countervailing forces.

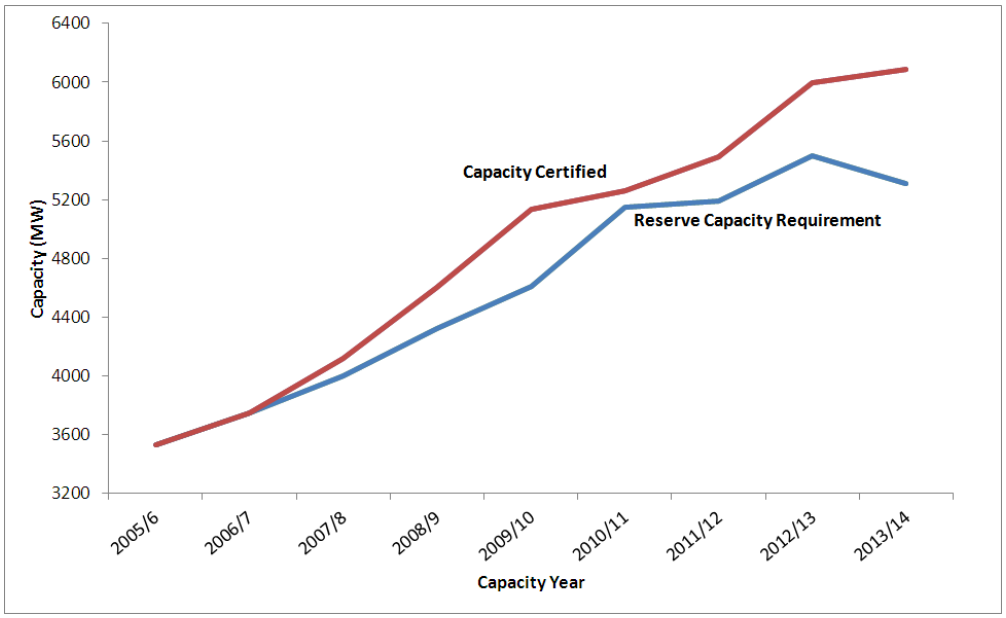
Ultimately, an RCM that supports too much excess reserve capacity implies higher costs due to excess investment. An RCM that fails to support sufficient reserve capacity implies higher cost associated with reduced reliability. The evaluation of the RCM against the Market Objectives requires striking a balance, keeping in mind that the costs associated with reduced reliability can be substantial and highly disruptive compared to the carrying cost of somewhat too much excess reserve capacity.

1.4. THE EXCESS RESERVE CAPACITY PROBLEM

Under the RCM, any resource that can establish itself as "committed" and declares itself as intending to trade bilaterally can secure Capacity Credits. Importantly, the RCM does not require facilities that have declared their intent to trade bilaterally to actually do so. By stating an intention to trade bilaterally and becoming a committed facility, a new entrant can enter the WEM and earn the administered RCP without ever entering into a bilateral contract, or necessarily intending to operate at all. As a result, the number of Capacity Credits can decouple (as it has) from the actual reserve requirement.

Historical review suggests that the RCM has produced excess reserve capacity and higher costs for customers. Appendix A reviews the cost of excess reserve capacity in the WEM based on analysis conducted in mid 2011, in which the amount of excess reserve capacity in the WEM was estimated to be around 9 percent in the 2012/2013 capacity year. The historical trend of certified capacity compared to the reserve capacity requirement is shown in Figure 1.

Figure 1: Historical Trend in Excess Reserve Capacity[2]

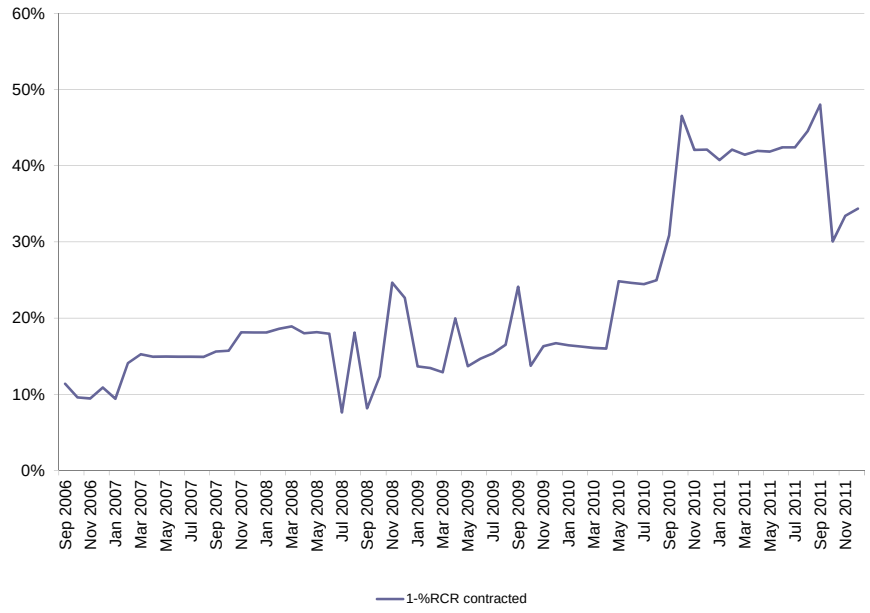


Currently, projected excess reserve capacity has *increased* to 14.6 percent for 2013/2014.[3] Furthermore, since mid-2010, the proportion of Capacity Credits that are purchased by the IMO directly (as opposed to being subject to bilateral trades between retailers and generators) has increased dramatically, as shown in Figure 2.

2 Source: IMO data provided to TLG in mid 2011. The reported trend data were current as at mid 2011.

3 Source: IMO data provided to TLG by the IMO in March 2012. Measured as: (Capacity Credits / Reserve Capacity Target) – 1.

Figure 2: Uncontracted Reserve Capacity Requirement[4]



The upward trend in the uncontracted reserve capacity requirement suggests that (1) generators prefer to contract with the IMO or (2) that retailers prefer not to contract with generators. The reason for either preference could be that it is perceived to be easier to deal with the IMO (e.g., lower transactions costs) or that there is a disconnect in the market (e.g., the IMO sets a floor price when the actual economic value of credits is lower).

1.5. THE RECENT DOWNWARD REVISION TO THE MRCP

The RCP is a function of the MRCP, which is, in turn, based on the estimated cost of connecting a 160MW gas turbine to the WEM. Recently, the MRCP was revised downward by approximately 32 percent. This revision and the reasons for it are relevant to our interpretation of RCM outcomes.

Revisions to the MRCP are to be expected from time to time as cost estimates or other parameter values change with market conditions. If cost estimates and parameter values change merely to track evolving market conditions, then the MRCP should track the cost of a 160 MW peaking unit. If the MRCP tracks these costs reasonably well, and the 160 MW peaking unit benchmark is a reasonable one, then the changes to the MRCP "should" be neutral with respect to any "incentive" to support or not support more reserve capacity. Put differently, if this year's MRCP is just sufficient to support new entry, and next year the MRCP parameters are revised to reflect the then applicable market conditions such that the MRCP remains, over time, just sufficient to support new entry, then from an investor perspective, the changes in the MRCP are neutral (unbiased).

4 Source: IMO data provided to TLG in March 2012.

But, the more recent changes to the MRCP included significant methodological and definitional adjustments as well. Two methodological changes had the largest impact, by far:

- The basis for the estimate of transmission connection costs was changed; and
- The specification of the generation technology was altered to incorporate inlet cooling.

Together, these changes reduced the MRCP by 23 percent after adjustments for year-on-year changes to input parameters. It is therefore reasonable to consider that historical MRCP values may have been too high.

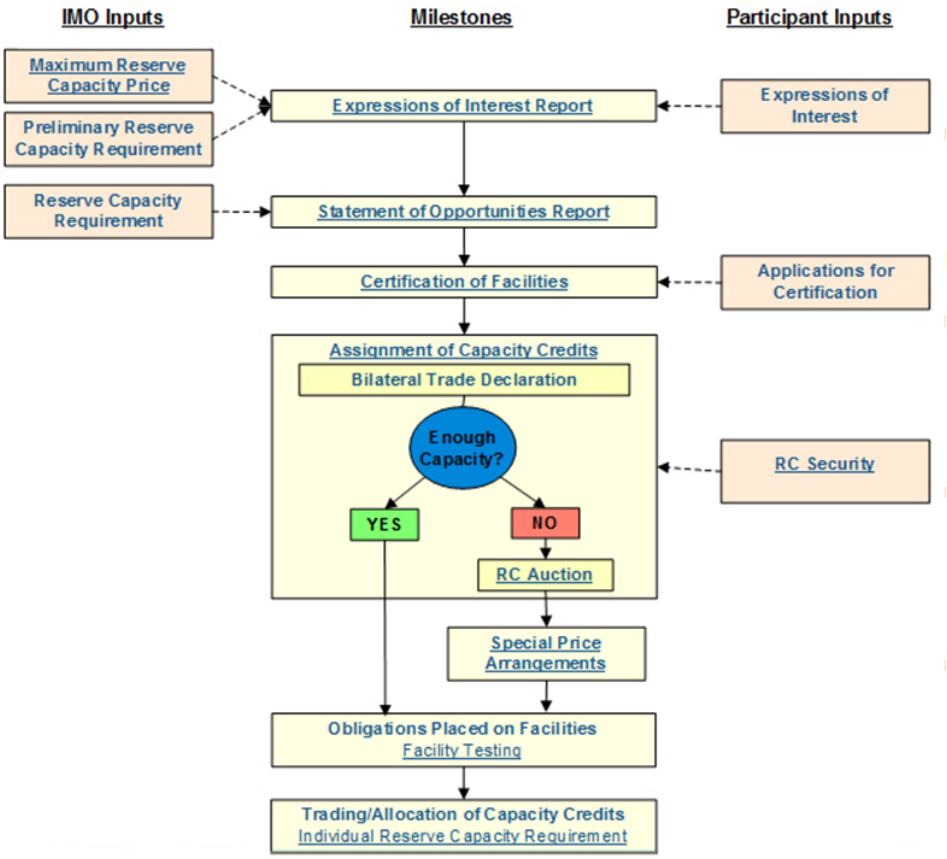
In the extreme, the 23 percent reduction in the MRCP from the previous level implies that the previous MRCP could have been 4 percent higher than the cost of new entry even after being scaled down by 85 percent (the base value of the RCP when administered and before further adjustment for excess reserve capacity). An RCP value that is above the cost of new entry would clearly support investment in the WEM. Changing the RCM adjustment formula to be more responsive to market conditions would certainly reduce the incentive to build capacity that is not yet needed, but so too would reducing the MRCP by changing the methodology upon which it is based.

Over the past year, stakeholders would have been aware of the review of the MRCP, including the signals throughout that review of the likely direction and nature of changes being considered, as well as also being aware of the concurrent RCM review. Stakeholders would also have seen the extent of excess reserve capacity, which obviously represents a standing “red flag”. Growing awareness of these factors correlates with the lowest level of new capacity entry in the WEM since commencement, a factor that possibly highlights the important role of expectations in investor decisions.

1.6. THE LINKAGE BETWEEN THE MRCP AND AN EFFECTIVE RCM

The overall RCM process is depicted in Figure 3.

Figure 3: RCM Process



If there is not enough reserve capacity in the WEM, a Reserve Capacity Auction is scheduled. Reserve capacity must be available (certified) to be eligible for participation in the auction. So long as the value of the credits is high enough, investors will invest and seek committed status, certification and an allocation of Capacity Credits.

It matters, therefore, how expectations of the RCP compare to the cost of new capacity. If the RCP can be adjusted downward, below the MRCP but never upward, above the MRCP, then the *expected* RCP value is likely to be *less* than the MRCP. Whether having an expected RCP that is below the MRCP is a problem depends on whether the expected RCP is below the cost of new capacity at a time when new capacity is needed. An expected RCP value below the MRCP could lead to a situation in which insufficient capacity over time is actually available to participate in the auction. To date, no auction has been needed. Nevertheless, it bears consideration when evaluating the scope for further adjustments to RCM parameters.

2. OPTIONS TO IMPROVE THE RCM

The RCP is an administered price initially set at 85 percent of the MCRP. The RCP is used by the IMO to purchase Capacity Credits that are not traded bilaterally. The RCP is further adjusted downward in the event there is excess capacity.

Currently, the adjustment to the RCP for excess reserve capacity is proportional with respect to the amount of actual supply relative to the amount of targeted supply. For example, if the amount of excess reserve capacity is ten percent, the adjustment constitutes an approximately nine percent reduction[5] in the RCP. This price adjustment reduces the value of a capacity credit, and thus reduces the support available to new capacity investment. If the downward adjustment is great enough, then investors will defer new investment—helping to reduce excess reserve capacity over time as demand grows.

The economic value of excess reserve capacity, however, is not a *linear* function of the amount of excess reserve capacity but is, instead, a much more dynamic. The more excess reserve capacity exists, the more quickly the economic value of incremental excess capacity falls to zero. Clearly, a more dynamically adjusting RCP can send an even sharper signal to investors to defer new investment until market conditions improve. This dynamism is bidirectional. In the extreme, the very short-term market value of a Capacity Credit could tend towards zero during periods of excess reserve capacity and towards virtually unbounded levels during periods in which there is significant looming scarcity of reserve capacity.

2.1. ADJUST THE SENSITIVITY OF THE RCP TO EXCESS RESERVE CAPACITY

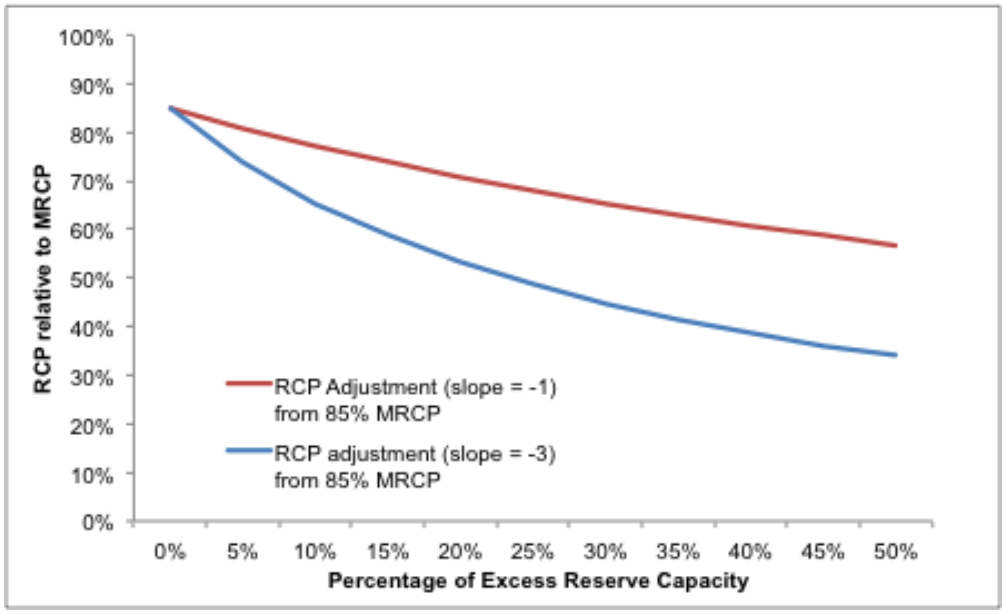
When too much excess reserve capacity exists, the implication is that the generation investors have seen opportunity to add capacity at a time when the retail sector did not need capacity. The supply and demand imbalance can be caused by an external disruption (and thus would likely be temporary), or it can be caused by a persistent failure of the market to adjust properly. As noted above, the RCM is intended to adjust to support adequate but not excessive amounts of reserve capacity.

5 For example, if the requirement is 100MW and capacity is 110MW (10 percent excess) then price is multiplied by 100/110, a 9.09 percent reduction.

The fact that the RCM has had persistent excess reserve capacity—while good from the point of view of assuring adequate generation resource availability—indicates strongly and clearly that the RCM does not adjust adequately to the supply and demand for Capacity Credits. A simple solution to this problem is to make the RCP adjustment mechanism more sensitive to market conditions. In the limit, the current administrative adjustment mechanism could be replaced with market-based approach. Though theoretically sound, a number of implementation and risk management challenges would quickly arise. The most important of these involves developing a design that mitigates the inherent price volatility (bounded between zero and infinity) of the market value of a capacity credit as a function of the amount of excess reserve capacity. Such a market-based approach would also be inconsistent with other administrative features of the WEM, and may not work effectively in such a small, lumpy market.

The easier way to adjust the RCP to make it more sensitive to market conditions is to adjust what we call the "slope" factor in the current RCP price-setting formula. Currently the slope is effectively "minus 1"—the RCP is adjusted downward in proportion to the amount of excess reserve capacity. A slope factor of "minus 3" would reduce the value of a Capacity Credit purchase at a faster rate, significantly strengthening the signal to generation investors to defer capacity investment until demand has increased, as shown in Figure 2.

Figure 4: RCP Adjustment Formula Comparison



A steeper slope can be implemented straightforwardly within the existing RCM structure and, of course, is readily amenable to periodic review for the purposes of tuning the RCM to deliver efficient outcomes over time. If the slope factor were changed from "minus 1" to "minus 3", the existence of 15 percent excess reserve capacity would result in the RCP being 58.6 percent of the MRCP rather than 73.9 percent, as summarised in Table 1.

Table 1: RCP as a Percentage of the MRCP (Same starting point)

Amount of Excess Reserve Capacity	Based on "-1 slope"	Based on "-3 slope"
0%	85.0%	85.0%
5%	81.0%	73.9%
10%	77.3%	65.4%
15% (~current)	73.9%	58.6%
20%	70.8%	53.1%
25%	68.0%	48.6%
30%	65.4%	44.7%
35%	63.0%	41.5%
40%	60.7%	38.6%
45%	58.6%	36.2%
50%	56.7%	34.0%

Alternatively, the RCP could be directly linked to the MRCP, rather than continue with the definition of the base RCP as being 85 percent of the MRCP, an adjustment that has unclear origins and no obvious foundational logical support. Eliminating the initial "85 percent adjustment step" would actually reduce the penalty relative to the MRCP for very small amounts of excess reserve capacity, though the increase in risk and the greater penalty for larger amounts of excess reserve capacity would remain strong disincentives to invest in excess reserve capacity, as shown in Table 2.

Table 2: RCP as a Percentage of the MRCP (Alternative starting point)

Amount of Excess Reserve Capacity	Based on "-1 slope" starting at 85 percent of the MRCP	Based on "-3 slope" starting at 100 percent of the MRCP
0.0%	85.0%	100.0%
5.0%	81.0%	87.0%
10.0%	77.3%	76.9%
15.0% (~current)	73.9%	69.0%
20.0%	70.8%	62.5%

Amount of Excess Reserve Capacity	Based on "-1 slope" starting at 85 percent of the MRCP	Based on "-3 slope" starting at 100 percent of the MRCP
25.0%	68.0%	57.1%
30.0%	65.4%	52.6%
35.0%	63.0%	48.8%
40.0%	60.7%	45.5%
45.0%	58.6%	42.6%
50.0%	56.7%	40.0%

A feature of the "minus 3" slope in combination with application directly to the MRCP rather than to a value that is equal to 85 percent of the MRCP is that it only slightly reduces the RCP compared to the current formula at the current level of excess reserve capacity, while making investment in *excess* reserve capacity inherently more risky.

2.2. TRANSITION MECHANISM APPLICATION

A change to the RCP formula or RCM mechanism has the potential to disrupt expectations of stakeholder value. In principle, if the disruptions are sufficient, and can be linked to economic detriment, a transition mechanism may be justifiable. The IMO Board has approved a framework for evaluating the appropriateness of transition mechanism application.[6] Having regard to that framework, it seems doubtful that a transition mechanism can be justified. In particular, the amount of excess reserve capacity is widely visible suggesting that it should be difficult to argue that a "right" to long-term compensation has been established for capacity that has no other value except the RCM itself. Investments that are justifiable primarily on the basis of an administrative mechanism rather than an underlying source of fundamental value should necessarily bear risk associated with eventual regulatory reform. Put differently, it is sensible to incentivise stakeholders to think carefully before investing in opportunities that exist primarily because of regulatory imperfections.

That said, if it is determined that a change to the RCP formula justifies consideration of a transition mechanism, several possible transition approaches exist:

- Initiate the steeper slope immediately, but transition via a "floor" price that starts at just five percent below what the current RCP methodology would produce and then reduce the floor price by five percent each year for three years before dropping the floor altogether; or

6 See: Kieran Murray, "Transition Arrangements: Guidelines", Sapere Research Group, May 2011.

- Introducing the steeper slope in a stepwise manner, with the slope moving from -1 to -1.5 in year one; to -2.0 in year two, and to -2.5 in year three and -3.0 in year four; or
- Introduce the refinements as of a projected date such that participants have time to make changes, if appropriate, in anticipation of the future implementation.

Each option mitigates the risk that unneeded additional capacity is added to the WEM. Each also provides time for participants to adjust (and for the market to potentially absorb existing excess reserve capacity).

2.3. INSTITUTE A QUANTITY-BASED CONTROL MECHANISM

We also previously considered the possibility of mitigating the risk of excess reserve capacity by controlling the *number* of Capacity Credits that are made available (supported) by the WEM at any point in time. A change that limits the number of additional Capacity Credit sources that are certified may be seen as protecting existing Capacity Credit suppliers against a reduction in the value of the Capacity Credits they have been awarded. At the same time, by effectively locking in the existing Capacity Credit holders, the lower economic value of Capacity Credits during periods of excess reserve capacity is not able to be passed on to consumers.

To implement a quantity restriction regime, the IMO could be the Capacity Credit gatekeeper through the certification process. If the level of reserve capacity exceeds a specified threshold, the IMO would not certify new capacity until the threshold is again met. This admittedly simplistic approach has the virtue of being easily implemented. If the threshold is exceeded, all certification of new supply sources would cease. Yet, many problems exist for which solutions are neither simple nor clear.

- What happens as conditions change, as they can quite quickly in the lumpy and relatively small WEM?
- If there are multiple projects queuing up for certification, perhaps each with varying degrees of bilateral contract commitments, how should the IMO choose?
- Currently commitment status is partly determined on the basis of irrevocable commitments. Why would facilities enter into irrevocable commitments if becoming "committed" did not assure access to Capacity Credits?
- Would a facility not be declared committed even if it had negotiated a bilateral contract covering all of its potential Capacity Credits?

The process of turning off the capacity certification "spigot" without modifying the RCP effectively puts the mouse on one side and the cheese on the other—a situation that is likely to be unstable and difficult to manage. An auction process could be used to prioritise projects against the quantity that is deemed certifiable at any point in time. But if one considers it reasonable to move to an auction-based approach to resolve such situations, it would almost certainly be even more reasonable to develop incentives that force stakeholders to sort themselves out through the bilateral market. For example, the IMO could propose simply to sell credits to short retailers at a punitively high price while offering to buy from long generators at a very much lower price.

2.4. Enhance Bilateral Market Support

An alternative to a pure spigot-control approach involves strengthening incentives for bilateral contracting of Capacity Credits. Bilateral contracts—which are really at the heart of the WA WEM design—could play a more direct role in the RCM, along the following lines:

1. IMO defines an IRCR for each retailer as now;
2. IMO certifies capacity as now (with all the adjustments already recommended re: intermittent supply sources and demand response);
3. Each retailer holds capacity credits equal to, or greater than, its IRCR. It pays for these capacity credits through the contracts it has with the suppliers (i.e. a bilateral approach); and
4. If the retailer does not hold sufficient capacity credits, then it is charged a penalty rate for not meeting the market rules (some penalty greater than the cost of procuring capacity, to act as a deterrent). The penalty revenues fund any supplementary auctions required to support new capacity. And any remaining revenues are returned to customers.

The IMO would probably need to administer a capacity trading platform that allows retailers to trade Capacity Credits to avoid mismatches. This would mean that those retailers with spare capacity credits can trade with those that are short. The IMO would continue to produce the periodic Statement of Opportunities and associated measures and reports that track overall system reserve capacity margins.

Measures to target large loads could include mechanisms to give block loads an incentive to accurately forecast their entry. For example, any new load connecting to the grid greater than a defined size may have to provide a security deposit to the IMO to cover the cost of capacity, procure capacity credits in advance of being allowed to connect or show that they have a binding retail contract which includes the provision of capacity credits from the date that the load actually connects. Intention is to put the onus on the loads to keep players updated about their entry and to pay for the costs of the additions to the system that they cause to occur, even if their entry is delayed.

Under this alternative, the ability for any generator to simply exist and earn capacity credits without a bilateral contract is removed. As a result, generators cannot claim that they will trade bilaterally while counting on the certainty of capacity credit revenue during periods of excess reserve capacity. Effectively, the IMO would no longer be in a position of effectively underwriting the financing of investments that contribute to increasing excess reserve capacity. It thus links the volumes in the market more closely to the aggregate IRCR required.

The risk of the mechanism is that some retailers may be unable to underwrite the bilateral contracts needed to bring in new generation. One of the benefits of the current mechanism is that a generator has some certainty that even if its bilateral counterparty fails, there is a source of revenue in the market. It was argued in the original market design that ensuring a credit-worthy counterparty is essential to new investment in any market and that remains true. There may, therefore, be merit in investigating mechanisms whereby the IMO can stand behind smaller retailers and pick up the capacity payment obligations (passed through to the market generally as now) should those retailers struggle. The capacity itself released by a failing retailer could be traded by the IMO in the market mechanism discussed above.

A move to an enhanced bilateral market based mechanism would involve a material shift in the RCM, and would necessarily involve a significant detailed design and implementation effort. Though we can see merit in the logic of such a rework of the RCM, it is likely to be difficult to justify such an extensive change at this point in time on cost-effectiveness grounds unless the existing administrative pricing mechanism could not be made to work.

3. SUMMARY

As currently configured, the RCM is an administrative mechanism. It makes limited use of market-based forces to establish the value of an uncontracted capacity credit. A theoretical *economic* capacity market would prevent this from occurring because supply and demand would be managed through the price mechanism. However, some forward capacity markets elsewhere have run into trouble (and required extensive and on-going redesign or adjustment) because they employed a forward capacity price that was set too close to delivery—at the point where volatility in the value of capacity begins to exhibit an all or nothing (zero or infinity) character. Bilateral agreements struck earlier in the process can mitigate this all-or-nothing pricing risk, and are naturally market-based. However, there is no requirement, currently, in the RCM that bilateral contracts actually be used. Instead, concern for the various “not-my-fault” reasons why a contract may not be entered into have led to a situation in which the clear benefits of bilateral contracting are reduced. Neither side has to make a commitment if it doesn’t want to.

One could promote bilateral contracting through mandatory requirements—not unlike the requirements imposed on “load-serving” entities in some US markets. Alternatively, the price charged by the IMO for capacity credits sold to retailers through the IMO could be increased to the point where bilateral contracting begins to look much more attractive. At the same time, the IMO could maintain a minimum purchase price for uncontracted Capacity Credits from generators, or this feature could be dropped completely (at the risk of greatly increasing investor risk). Such a reduction is already achieved using the RCM mechanism, but the question arises whether the reduction is steep enough to engender the expected response.

Currently, the RCP is adjusted downward in proportion to the amount of excess reserve capacity that exists. A straightforward change would focus on sharpening the administrative price adjustment mechanism to be more responsive to the amount of excess reserve capacity in the WEM. Doing so would reduce the discrepancy between the RCP and the economic value of a capacity credit. By reducing the gap, the risk of unintended consequences, rent-seeking behaviour and other generally value-destroying outcomes is diminished. The risk to be avoided is one in which the adjustments to the RCP are so sufficiently and consistently downward without any chance of an offsetting upward adjustment that the expected value of a Capacity Credit over the life of a capacity investment is not sufficient to support that investment commercially.

APPENDIX A: COST OF RESERVE CAPACITY

The analysis described below was conducted in mid-2011, but remains equally, if not even more, relevant today as the amount of excess reserve capacity has increased in percentage terms.

The 2008 SOO set the Reserve Capacity Target for the 2010/11 Capacity Year at 5,146MW. This was based on a projected Peak Demand (10 percent POE case) of 4,704MW plus a reserve margin. As a result, there was an excess of 2.19 percent[7] of Capacity Credits procured for this year and the RCP was therefore correspondingly reduced by 2.14 percent. The actual RCP paid in the 2010/2011 year was AUD 144,235 per MW per annum. In the following discussion, we consider the economic value of *incremental* capacity in the context of the WEM. The value we derive is meaningful principally as a measure of the value attached to improved reliability and generation adequacy reasonably associated with an investment that increases the amount of capacity in the WEM by one megawatt. While this type of estimate does not indicate the overall cost of excess capacity, it is the value that is most relevant to the evaluation of the workings of the RCM in terms of providing incentives for investment. Investment is always about the *next* increment of capacity.

The reliability standard in WA is based on the 10 percent POE forecast peak demand supplied through the SWIS plus a reserve margin equal to the greater of 8.2 percent of the forecast peak demand and the maximum capacity of the largest unit on the system. Expected energy shortfalls are to be limited to 0.002 percent of annual energy consumption.

This reliability standard defines a target level of capacity based on target reserve margin and expected unserved energy (EUE). The marginal value of capacity, however, relates to the loss-of-load probability (LOLP), rather than the EUE. Why is this? One incremental MW of capacity would allow an additional MW of load to be served whenever there is a loss-of-load situation. Accordingly, the annual LOLP measures the decrease in EUE that would result from an additional MW. Since the value of capacity arises from reducing unserved energy, this economic value is directly related to LOLP.[8]

In practice, the LOLP will always exceed the EUE on a fractional or percentage basis. On a percentage basis, the EUE will equal the LOLP (on a percentage basis) times the average share of the total load left unserved during each loss-of-load event. Since the LOLP is small and the average share of load left unserved during each event is small, the EUE equals the product of two small numbers.

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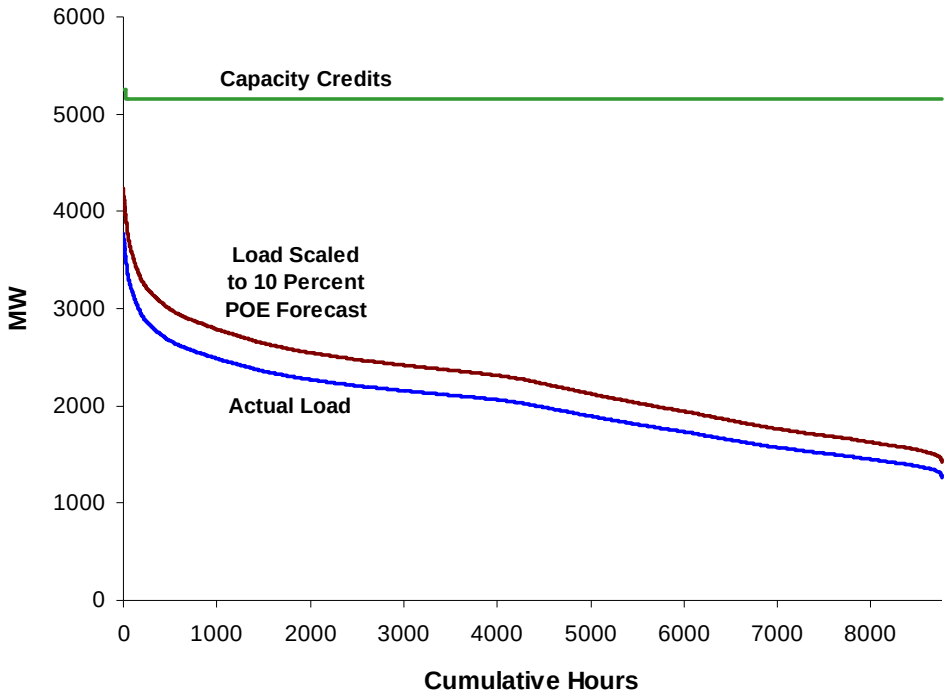
7 Source: Maximum reserve capacity price cap calculation on website.

8 Since unserved energy is typically imposed on customers involuntarily (and somewhat arbitrarily), the marginal value equals the LOLP times the average value of lost load (VOLL) for the customers who are curtailed. This relationship was the impetus for the half-hourly capacity price payment in the original England and Wales pool. While this was an elegant mechanism, it was disastrously prone to manipulation. Nonetheless, as a measure of true system value, the calculation – assuming a true declaration of availability – was entirely appropriate.

Figure 5 shows the approximate capacity duration curve and the load duration curve for the 2009/10 capacity year. The capacities are based on the allocated capacity credits. The small peak in the capacity duration curve represents the DSM capacity, in each of the classes. We implicitly assume that DSM can be dispatched perfectly into each of the very top 24 hours that most DSM resources have obligations to be available. Because of planned maintenance needs, the quantity of capacity credits somewhat overstates the actual availability during off-peak periods.

Figure 5: Load and capacity duration curves for 2009/10



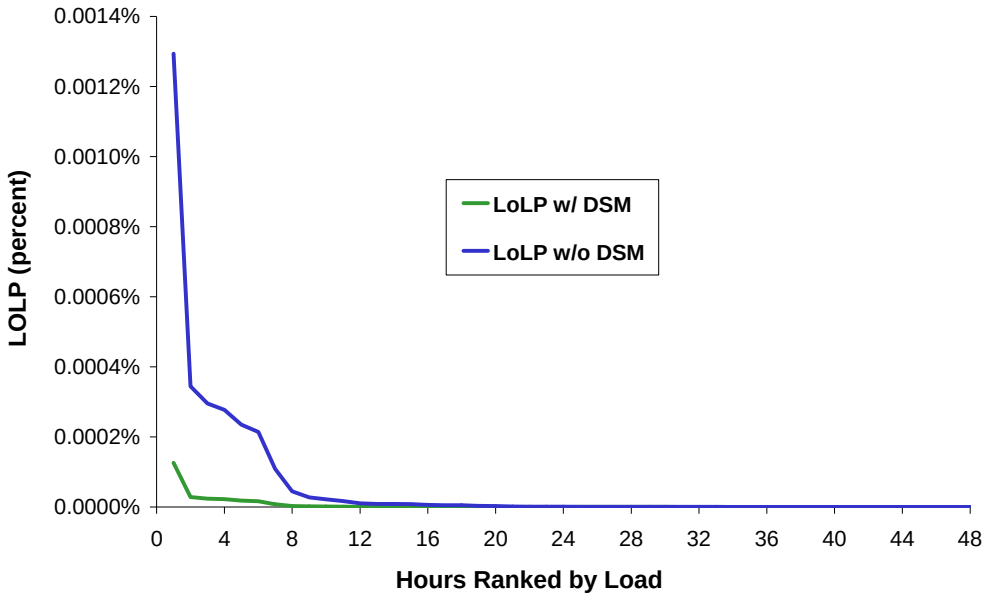
But the quantity of capacity is really only relevant during the extreme peak hours in which the load duration curve hits high loads. Figure 5 presents two different load duration curves – one depicting the actual loads and a second scaled to match the 10 percent POE forecast as of the 2007 forecast. The value of the RCM is clearly concentrated in the approximately top 200 peak hours in which the difference between the load and capacity available is the smallest.

We can calculate the LOLP associated with the supply and demand situation at each point in time. For example, the available capacity of each unit in a given hour (C_i) is an uncertain variable, due to the possibility of forced outage. Similarly, the load in that hour (L) is subject to forecasting error. The LOLP is the likelihood that L exceeds the sum of C_i across all units in the system. A number of different algorithms exist to form this required distribution of load less total capacity and solve for the likelihood that this quantity is positive.

Note that the LOLP is a time-dependent concept. A year ahead, the LOLP in any given hour would necessarily be based on average forced outage rates and load distributions. As we approach real time, our estimates of outage likelihoods and loads become more precise. In the original UK electricity market, the capacity payment paid to any participant was made up of the LOLP estimated a day ahead multiplied by the Value of Lost Load (VOLL). After the fact, LOLPs are either one or zero – that is, load was lost or it wasn't.

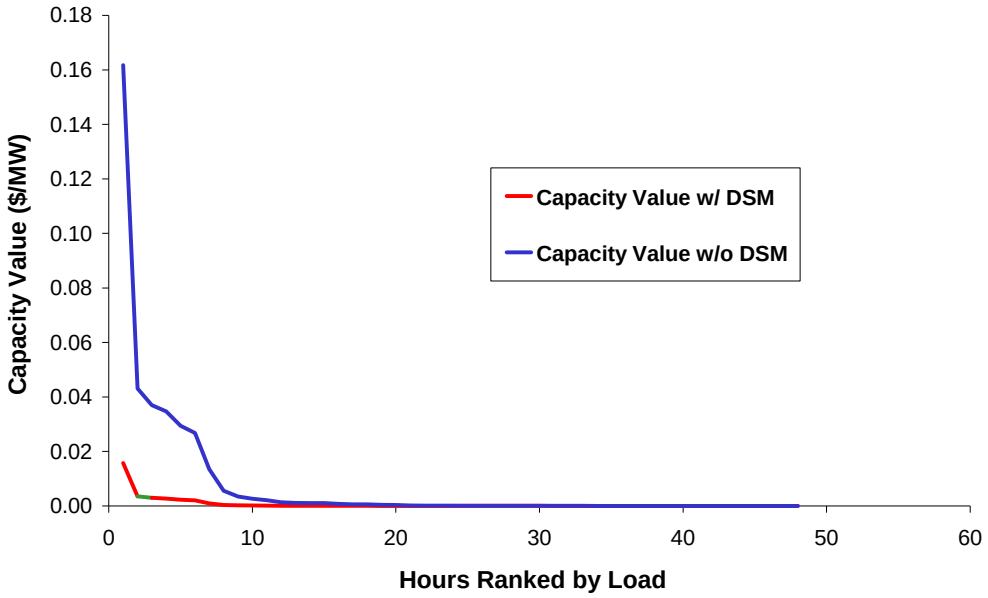
Figure 6 shows LOLPs in the WEM for 2009/10, as derived using the actual hourly loads and assuming average forced outage rates.

Figure 6: LOLP for 2009/10 capacity year



If we then assume for illustrative purposes that the value of lost load is AUD12,500/MWh, which is the value of the Market Price Cap in the National Electricity Market covering the eastern states, then the value of the capacity can be shown as in Figure 7.

Figure 7: Value of capacity using NEM VOLL figures



Based on these assumptions, the value of *incremental* reserve capacity across the whole year in the WEM is less than AUD1/MW (even without DSM included). The actual price paid in 2009/10 was AUD108,459/MW. This highlights the extent to which customers in WA overpay for capacity *at the margin* based on the actual requirement for reserve capacity in the market, at the margin.[9] Alternatively, it highlights the extent of unnecessary "signal" currently being sent to potential investors, inviting them to develop capacity that is not needed in the market at this time.

Of course, the point of the RCM is to ensure reliability based on what *might* occur, rather than what actually did occur. If we base the analysis on the 10 percent POE forecast[10] of demand from 2007 (the year in which the RCR for the 2009/10 Capacity Year was forecast), then we see a different outcome.

9 This is not to imply that capacity has no value to consumers. But the value of each *incremental* MW is less. This analysis measures the marginal value, which is extremely low because there are so many excess MW.

10 This has been done simplistically by scaling the top 48 hours of the demand hours in the year by the ratio between the 10 percent POE peak demand and the actual peak demand in 2010 and scaling the rest of the hours in the year so that the total energy matches the high energy demand forecast for the year. As such it almost certainly over-estimates the energy in the year; however, it gives a feel for what the difference of a 10 percent POE versus actual peaks might be.

Figure 8: LOLP based on 10 percent POE forecast for 2009/10

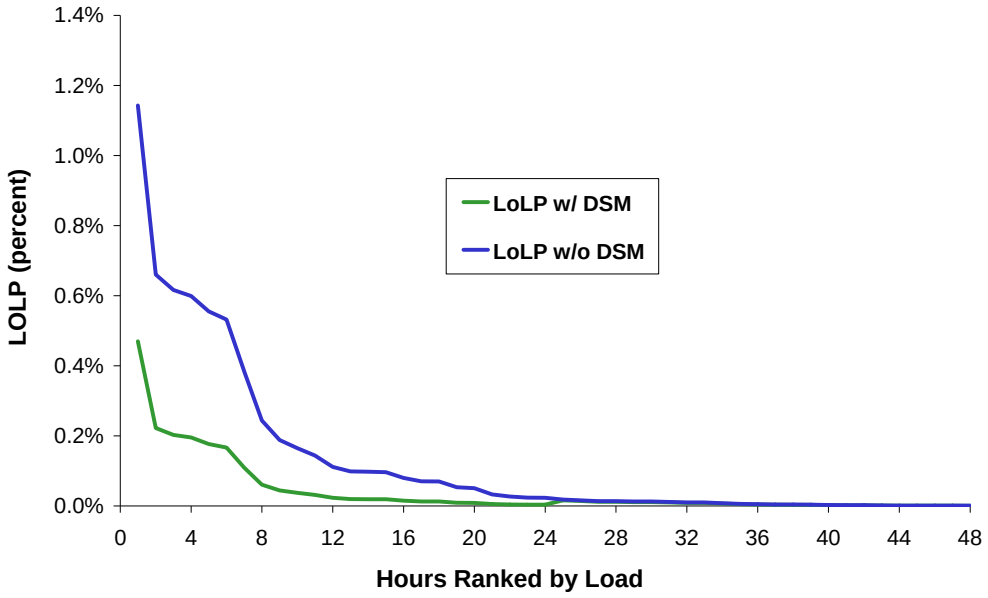
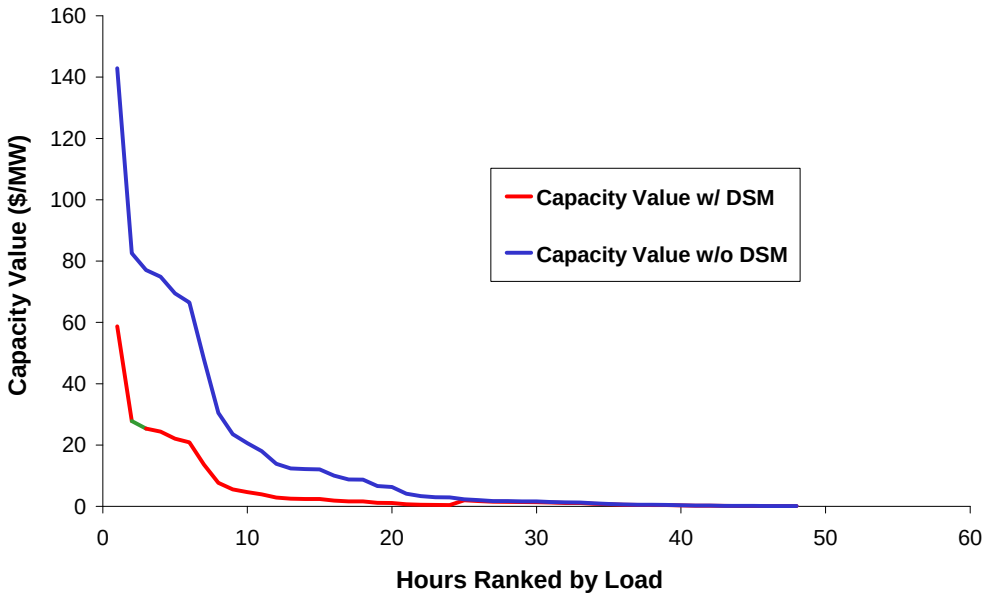


Figure 9: Value of capacity based on 10 percent POE forecast



In this instance, the value of incremental reserve capacity over the year is AUD 253/MW with DSM or AUD 780/MW without it. These values are still much lower than the actual cost of reserve capacity in the RCM.

Agenda Item 6: Proposed Schedule for RCM WG Scope of Works

Issue	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Oversupply of Capacity in the WEM, Pricing of Capacity in Oversupply Conditions and Additional Costs Imposed on the Market									
Role of DSM in the RCM, and the Fuel Requirements Imposed on Generation Capacity Providers									
The Allocation of Capacity Costs to Market Customers (IRCR)									
The Alignment of the Implementation of a Dynamic Reserve Capacity Refund Regime									
The Impact of Forecasting Inaccuracy on the RCM									
Timeline and Scope for a Periodic Review of the RCM									

NB: Timing of issue discussion is subject to change depending on progress